

Remarks

This Amendment is in response to the Official Action mailed on January 26, 2005. A petition and fee for extension of the deadline for response by two months are enclosed. A supplemental Information Disclosure Statement is also enclosed. The Official Action rejected claims 1, 2 and 5-12 under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos et al., U.S. Patent Application Publication No. 2004/0161873 ("Dimitrakopoulos"). The Official Action rejected claims 13-18 under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos. The Official Action rejected claim 19 under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos. The Official Action rejected claim 20 under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos. The Official Action objected to claims 3 and 4 as not written in independent form. Claims 1, 3, 10, 11, 13, 17, 19 and 20 have been amended. New claims 21-26 have been added. Claims 2, 4-7 and 14 have been cancelled without prejudice. Claims 1, 3, 8-13, and 15-26 are presently pending.

The Rejection of Claims 1, 2 and 5-12

Claims 1, 2 and 5-12 stand rejected under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos. Applicants respectfully traverse this rejection in view of the above amendments in the claims and the discussion below.

Claim 1 has been amended to be more clear and distinct. Claim 1 now recites that second ends of molecules of the first compound comprise at least y minus 2 conjugated pi-electrons, in which y is an integer of 10 or more.

Claim 1 now additionally recites that the polycrystalline semiconductor layer comprises organic semiconductor molecules with aromatic portions comprising y conjugated pi-electrons.

Dimitrakopoulos discloses a method including a step of treating all exposed surfaces of a transistor structure with compounds under conditions effective in forming self-assembled monolayers (SAMs) of molecules with specific chemical and geometric structures.

Dimitrakopoulos states that this may require treatment of the substrate with more than one compound to create SAMs on varying materials. The formation of the SAMs is carried out prior to deposition of an organic semiconductor. Para. 0014.

For treating all exposed surfaces with compounds that will form appropriate SAMs, Dimitrakopoulos discloses that molecules having the general formula RZ or RZ_2 are employed. The basic structure of these compounds is depicted in Figs. 1 and 5, wherein Z is a chemical group that will bind to either the substrate or gate insulator or the source and drain electrodes, and R is an organic structure with either a saturated or unsaturated cycloaliphatic or aromatic ring system terminating the molecule such that the terminal bond on the molecule is parallel to the substrate surface. The specific structure of the R group is said to promote improved ordering of subsequently deposited organic semiconductors, such as pentacene. Monolayers formed from molecules with ring systems terminating in bonds that are parallel to the surface are claimed to result in organic semiconductor films with consistently improved electrical performance compared to semiconductor layers formed on monolayers with other chemical or geometric structures, or when no monolayer is used. Paras. 0034-0036; and paras. 0055-0058.

Referring to Figs. 2-4, Dimitrakopoulos further explains the possibility of treatment of the substrate with more than one compound to create SAMs on varying materials. Fig. 2 shows a single SAM 18, which overlies a gate insulator 14 and on which an organic

semiconductor 16 is applied. Figs. 3 and 4 also show a second monolayer 22. Monolayers 18 are formed on the surfaces of the insulator or substrate. Monolayers 22 are formed on the electrodes. Para. 0055. Referring to Figs. 3 and 4, Dimitrakopoulos states that if more than one monolayer is to be deposited on the substrate, the monolayer on the electrodes is formed after the monolayer on the substrate/insulator. Once all of the monolayers have been formed, the organic semiconductor material is deposited thereon. Para. 0065.

Dimitrakopoulos fails to disclose and fails to suggest, as defined in claim 1, a semiconductor apparatus comprising a first dielectric layer covalently bonded to a first region of a substrate surface, and in which:

the first dielectric layer comprises molecules of a first compound, the molecules of the first compound having first ends and second ends, the first ends being covalently bonded to the first region of the substrate surface, the second ends having aromatic regions comprising at least $y - 2$ conjugated pi-electrons, in which y is an integer of 10 or more; and

the semiconductor apparatus comprises a polycrystalline semiconductor layer comprising organic semiconductor molecules with aromatic portions comprising y conjugated pi-electrons, the polycrystalline semiconductor layer being on the first region of the substrate.

Accordingly, Dimitrakopoulos fails to disclose and fails to suggest any of dependent claims 8-12. Claims 2 and 5-7 have been cancelled.

The Rejection of Claims 13-18

Claims 13-18 stand rejected under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos. Applicants respectfully traverse this rejection in view of the above amendments in the claims and the discussion below.

Claim 13 has been amended in a manner analogous to the amendments discussed above with regard to claim 1. Accordingly, Dimitrakopoulos further fails to disclose and fails to suggest, as defined in claim 13, a method of making a semiconductor apparatus comprising such a first dielectric layer covalently bonded to a first region of a substrate surface. Accordingly, Dimitrakopoulos fails to disclose and fails to suggest any of dependent claims 15-18. Claim 14 has been cancelled.

The Rejection of Claim 19

Claim 19 stands rejected under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos. Applicants respectfully traverse this rejection in view of the above amendments in the claims and the discussion below.

Claim 19 has been amended in a manner analogous to the amendments discussed above with regard to claim 1. Accordingly, Dimitrakopoulos additionally fails to disclose and fails to suggest, as defined in claim 19, an integrated circuit comprising such a semiconductor apparatus.

The Rejection of Claim 20

Claim 20 stands rejected under 35 U.S.C. § 102(e) as assertedly anticipated by Dimitrakopoulos. Applicants respectfully traverse this rejection in view of the above amendments in the claims and the discussion below.

Claim 20 has been amended in a manner analogous to the amendments discussed above with regard to claim 1. Accordingly, Dimitrakopoulos also fails to disclose and fails to suggest, as defined in claim 20, a method of making such an integrated circuit.

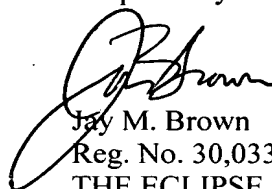
Allowable Claims

Claim 3 has been amended to incorporate all of the limitations of independent claim 1. Applicants accordingly traverse the objection to claim 3 as not being written in independent form, since the present amendment effectuates such independent form. Accordingly, claim 3 is allowable. Claim 4 has been cancelled without prejudice.

Conclusion

All of the pending claims as now amended appearing to be patentable over the cited reference, allowance of all pending claims is earnestly solicited. The Examiner is respectfully requested and invited to contact the undersigned by telephone to facilitate resolution of any issues that may remain.

Respectfully submitted,



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